National Institute of Environmental Health Sciences

Wildfires drive interannual variability of organic carbon aerosol in the western US in summer

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Abstract:

Forest wildfire area burned in the western U. S. has increased in recent decades resulting in a substantial organic carbon (OC) source with large interannual variability. We derive OC emissions from wildfires using data for area burned for 1980 - 2004 and ecosystem specific fuel loadings. For the period 1989 - 2004 we analyze OC observations in the western U. S. from the IMPROVE network and use a global chemical transport model to simulate OC concentrations. Modeled and observed OC concentrations are highly correlated when we use interannually varying fire emissions (R-2 Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.88); the correlation is smaller with climatological emissions (R-2 Euro Surveillance (Bulletin Europeen Sur Les Maladies Transmissibles; European Communicable Disease Bulletin) 0.4). We estimate that the observed increase in wildfire activity after the mid 1980s has caused mean OC concentrations in summer over the western U. S. to increase by 30% relative to 1970 - 1984. In the coming decades, climate change will likely cause further increases in wildfires resulting in increased OC concentrations with implications for health and visibility.

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Resource Description

Exposure : ☑

weather or climate related pathway by which climate change affects health

Air Pollution, Extreme Weather Event

Air Pollution: Other Air Pollution

Air Pollution (other): organic carbon

Extreme Weather Event: Wildfires

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

United States

Health Impact:

specification of health effect or disease related to climate change exposure

Health Outcome Unspecified

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified